REMARKS

In the Office Action, the Examiner noted that claims 1 – 16 are pending in the [illegible] application, and claims 1 – 16 are rejected. The Examiner's rejections are traversed [illegible] below.

AMENDMENT TO THE SPECIFICATION

The Applicant requests entry of an amended first paragraph of the specification. This paragraph has been amended to update the reference to a related application now that the related matter has issued as a U.S. Patent. The Applicant hereby states that no new matter has been introduced as a result of this amendment.

REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1, 2, and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,404,594 to Hannan (hereinafter referred to as "Hannan"). and further in view of U.S. Patent 5,647,025 to Frost et al. (hereinafter referred to as "Frost").

Hannan discloses an imaging system that generates a composite image of an object from a plurality of sub-images having different focus attributes. Hannan desires an image of an object where the depth of field is enlarged for a given field of view. Generally, Hannon uses a line scan sensor to obtain a plurality of sub-images, each of the plurality of sub-images being acquired at a different focus setting. A composite image is generated by combining the sub-images (line scans) having a maximum sharpness of features over the entire sub-image, to simulate an imaging system having an enlarged depth of field.

Frost discloses a method and apparatus for automatically focusing a microscope coupled to a machine vision system to examine biological specimens. Frost teaches a method to perform a focus scan over the area of the object under inspection, while acquiring and analyzing a number of images, each image having a different focus setting. Multiple scans are necessary since the object under inspection is too large to be represented in a single field of view. Frost determines a sharpness score that is associated

with the focus setting and the location of the image on the object for each acquired image (col. 8, lines 1-5).

The Examiner notes that Frost discloses the step of determining the spatial [illegible] weighting using sharpness score of each portion, citing column 8, lines 50-67, and bases the rejection under § 103 by combining the disclosure of Hannan for computing a composite image with the spatial weighting suggested by Frost. Regarding claim 1, the Applicant respectfully asserts that the combined teachings of Hannan and Frost do not support a basis for rejection under § 103 because there is no suggestion or motivation to combine or modify the references. Hannan discloses an apparatus that provides image samples at a plurality of focus positions. Each image sample is a sub-image of the overall field of view that is defined by the size of the line sensor array. When constructing the composite image, the Hannan imaging system need only assemble each sub-image having the maximum sharpness measurement (see Hannan, col. 5, lines 27-35). One of ordinary skill in the art would not have seen the need to determine a spatial weighting using a sharpness score derived from the sharpness measurements without resorting to impermissible hindsight reconstruction. Hannan does not need to consider spatial weighting for its sharpness measurements since it uses the sharpness measurement for the entire sub-image.

Further, when considering Applicant's claim 1 as a whole, the combination of Hannan and Frost fail to render the subject matter obvious to one of ordinary skill in the art. Hannan provides a number of sub-images at a number of effective focus settings, and measures the sharpness of each sub-image. Frost uses the focus score to *choose* the focus setting that provides the best focus, and *associates* the chosen focus setting with the position of the image on the object where the determination was made. The ultimate goal that Frost teaches is not to generate a focused image, but rather to generate a model of the focus surface of the object – that is, a spatial relationship of the optimal focus setting that can be set for any (x,y) position on the object to attain a focused image of that position. Frost computes a spatial weighting using the sharpness score – but there is nothing in Hannan to suggest the need to generate a composite image using the spatial weighting.

As stated by the Federal Circuit, "[it] is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. ... One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to depreciate the claimed invention." *In re* Fritch, 23 USPQ2d 1780 1784 (Fed. Cir. 1992).

Accordingly, in view of the above argument, the Applicant believes that claim 1 is patentable over the prior art. Analogous argument can be applied with regard to claims 2 and 5, as they depend from claim 1, to show that those claims are also patentable in view of the prior art.

Claims 3 and 4 are rejected under § 103(a) as being unpatentable over Hannan and further in view of Frost and further in view of U.S. Patent 4,616,262 to Toriumi (hereinafter referred to as "Toriumi").

Regarding claim 3, argument analogous to that put forth above in reference to claim 1 applies, that alone render claims 3 and 4 patentable at least because they depend from claim 1. Further, the teachings of Hannan and Frost in combination with Toriumi fail to support a rejection of claims 3 and 4 under § 103.

Toriumi discloses a method and apparatus that forms a composite image of two or more images. The method suggests correcting the pixel density of one image at the interface between the two images so that the composite image does not exhibit degraded image information at the transition. There is nothing in Hannan that teaches or suggests that a composite image of sub-images requires any correction at the transition between sub-images. There is nothing in Frost that teaches or suggests that any such correction is necessary, because Frost does not teach that a composite image can be generated using its spatial weights. Therefore, there is nothing in any of Hannan, Frost or Toriumi that would suggest that any of the references can be combined to render the subject matter of the Applicant's claims 3 and 4 obvious to one of ordinary skill in the art. Accordingly the Applicant believes claims 3 and 4 are patentable over the cited prior art.

Claims 8, 9, 10 and 11 are rejected under § 103(a) as being unpatentable over Frost and further in view of IEEE Publication entitled "Inverse Filters for Reconstruction

of Arbitrarily Focused Images from Two Differently Focused Images" by Kubota et al. (hereinafter referred to as "Kubota").

Kubota teaches a method of reconstructing images having different focus to generate an arbitrarily focused image – i.e., a synthetic image at any of a desired focus setting having a realistic appearance. The Examiner cites Kubota for teaching the step of using a fuzzy transition when the at least one region overlaps an adjacent image region, per claim 8. While Kubota suggests methods for blending regions of a synthetically rendered arbitrarily focused image to appear realistic, the combined teachings of Frost and Kubota fail to teach the method claimed by Applicant. Neither Frost or Kubota, alone or in combination, teach or suggest the step of generating a focused image using the portion of at least one image and the spatial weighting. Again, since Frost does not teach or suggest the generation of a composite image, the image region reconstruction teachings of Kubota are not useful to one skilled in the art without impermissible hindsight reconstruction. Further, the Applicant's statements in the specification of the application relating to commonly known methods for blending transitional regions fails to render the claimed subject matter obvious when the claims are viewed as a whole. Accordingly, the Applicant believes claims 8, 9, 10, and 11 are patentable over the cited prior art.

Claims 15 and 16 are rejected under § 103(a) as being unpatentable over Frost and further in view of U.S. Patent 5,179,419 to Palmquist et al. (hereinafter referred to as "Palmquist").

Palmquist discloses a method of inspecting defects in optical fiber end faces. Palmquist teaches that an optimal focus position can be empirically derived from a focus function based on a sharpness measurement at the ferrule portion of the fiber. Palmquist, col. 7, lines 25-61. Defects in the fiber end face can be inspected in a composite image generated from two images acquired at the auxiliary focus positions in front of and behind the optimum focus position. Palmquist, col. 8, lines 1-4. As noted above, Frost uses a focus score to *choose* the focus setting that provides the best focus, and *associates* the chosen focus setting with the position of the image on the object where the determination was made to derive a spatial weighting.

According to the MPEP, the prior art references when combined must teach or suggest all the claim limitations to establish a prima facie case of obviousness (MPEP § 2143). The combination of Palmquist and Frost fail to teach or suggest the step of generating a focused image using the portion of the at least one image *and the spatial weighting* as claimed by the Applicant in claims 15 and 16. Neither Palmquist or Frost generate a composite image using spatial weighting, nor do they teach or suggest that such a step is desirable. The combination of the inspection of a composite image as taught by Palmquist with the spatial weighting of selected focus settings does not render the Applicant's claim obvious to one of ordinary skill in the art.

Accordingly, the Applicant believes that claims 15 and 16 are patentable over the cited prior art.

REJECTION UNDER 35 U.S.C. § 102(b)

Claims 6, 7, 12, 13 and 14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Frost.

Frost discloses a method and apparatus for automatically focusing a microscope coupled to a machine vision system to examine biological specimens. Frost acknowledges that it is difficult to attain sharp focus of features of an object at high magnification because of the limited depth of field that such optical inspection systems inherently posses. The solution that Frost teaches is to perform a focus scan over the area of the object under inspection, while acquiring and analyzing a number of images, each image having a different focus setting. Frost determines a sharpness score that is associated with the focus setting and the location of the image on the object for each acquired image (col. 8, lines 1-5). Frost computes a spatial weighting from a focus score for images of regions of the object, each of a plurality of images – but the reference fails to teach or suggest the step of "generating a focused image using the portion of the at least one image and the spatial weighting," as claimed by Applicant.

The Examiner notes that Frost discloses the step of generating a best-focused image using the spatial weighting, citing column 8, lines 60-67, and column 9, lines 1-2. Actually, Frost uses the focus score to *choose* the focus setting that provides the best

focus, and *associates* the chosen focus setting with the position of the image on the object where the determination was made. The ultimate goal that Frost teaches is not to generate a focused image, but rather to generate a model of the focus surface of the object – that is, a spatial relationship of the optimal focus setting that can be set for any (x,y) position on the object to attain a focused image of that position. Accordingly, Frost does not teach or suggest the step of generating a focused image using the optimally focused image and the spatial weighting, but merely provides a profile by which a microscope can be adjusted to attain an optimal focus setting when examining the object at high magnification.

By contrast, in claim 6 the Applicant claims a method of measuring a sharpness score, and determining a spatial weighting for the image using the sharpness score, and generating a focused image using the image and the spatial weighting. Since the method as claimed by the Applicant is not disclosed by Frost, claim 6 is patentably distinguishable from the prior art.

Regarding claims 7, 12, 13, and 14, that depend from claim 6, analogous argument applies with respect to Frost. The step of generating a focused image using the image and the spatial weighting, not disclosed by Frost, is common to each of claims 7, 12, 13, and 14 as they depend from claim 6. Accordingly, these claims are also patentably distinguishable from the prior art.

CONCLUSION

In view of the above remarks, Applicant respectfully requests withdrawal of all rejections and allowance of the claims pending in the application. The Examiner is invited to telephone the undersigned Applicant's Attorney to facilitate advancement of the present Application.

Respectfully submitted,

Arthur J. O'Dea
Registration Number 42,952
Patent Attorney
Cognex Corporation
One Vision Drive
Natick, MA 01760
(508) 650-3108

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